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Opinion, U. S. District Court for the Middle District of North Carolina

HAYES, District Judge:

On May 20, 1952, F. R. Redman obtained the Patents in suit, No. 2,597,528 for an apparatus and No. 2,597,530 for a method of treating tubular knitted fabric to prevent the garment made therefrom from shrinkage [sic] after washing and laundering. These patents issued on an application filed October 22, 1948. Patent '528 may be called Redman's Normalizer and '530 the Normalizing. These patent rights are now owned by Redman with exclusive licensing rights vested in his co-plaintiff. While Stedman Manufacturing Co. is the defendant named as the user of the accused device, Tubular Textile Manufacturing Co. is the manufacturer and owner and lessor and is in charge of and conducting the defense and hereafter will be referred to as the defendant.

The defenses are (1) invalidity based on prior art and (2) non-infringement. Little need be said on the defense of invalidity. The knitting industry is an old and wide spread business. Practically all of the larger knitting companies are members of Underwear Institute which exists as an agency to promote the welfare of the industry. It is agreed that there existed a serious shrinkage problem in knitted fabrics before 1934. The fabric is knitted in courses and wales on a tubular head and the fabric is knitted into 100 yard lengths. After it is thus knitted, it is processed by washing, bleaching and dyeing and extracting. When the fabric got wet and heavy, the moving of it exerted a "pull" or "drag" which elongated the stitches and narrowed their width, thereby distorting the fabric. After it had been treated and dried to be cut into garments, it was discovered by the entire industry that the garments, after being worn and laundered, would shrink out of fit by drawing up in length and broadening in width. The problem was universally known and ways and means to solve the

problem were universally sought by the manufacturers and the manufacturers of knitting machinery.

Redman had obtained two patents and had an application for another patent pending dealing with the problem, but they are not involved here. He had copyrighted the name "Redmized" [sic]. In 1944 the Underwear Institute became interested in the Redman inventions. It appointed a committee of mechanical experts from the larger knitting companies to investigate them and make recommendations. Pursuant thereto negotiations with Redman culminated on May 1, 1945, in a written trust agreement between Redman and Trustees named by the Underwear Institute. The important features of the agreement were: Transfer by Redman to the Trustees of his patents and pending application, *also any patents or applications for patents made by him during the life of the contract;* [emphasis by the Court] he was to be employed by the Trust at $12,000.00 per annum and use his knowledge in the development, improvement and commercialization of the apparatus and process to overcome shrinkage in knitted fabric; the Trust would grant licenses and collect fees; employ counsel and procure machinery to carry out the objects of the Trust; it was to secure $75,000.00 in contributions from knitting companies and do all of the needful things to develop and commercialize Redman's inventions. The document enumerates in its 26 pages the obligations and benefits respectively of Redman, the Trustees and the contributors and licensees.

There were 59 contributors among knitting companies whose contributions during the life of the contract amounted to $121,500.00. It is significant that among the manufacturers who contributed $5,000.00 or more were Atlas Underwear Co., William Carter Co., Gibbs Underwear Co., P. H. Hanes Knitting Co., Utica Knitting Co. and Wilson Brothers. Even Munsingwear, who had wrestled with the

problem since 1934 and had obtained some patents relating thereto, contributed $3,000.00. The voluminous record is replete with written documents from 1945 to 1950, when the Trust was terminated, which show the struggle to solve the problem and the experiments and progress made by the Trust, including Redman, culminating in the application #55,963, on Oct. 22, 1948, on which the patents in suit issued.

Having spent three weeks in the trial and observing the machines demonstrated and that much time studying the record, briefs and requests, the court is thoroughly satisfied that there is novelty in both patents in suit and that the claims in suit are valid. The innumerable publications and patents relied on by the defense do not constitute anticipation nor teach the art involved in the patents in suit. If these documents, one or all of them combined, taught or suggested, the Redman invention to those skilled in the art, as is now so earnestly advanced by the defendant, it is surpassingly strange that none discovered it when all were diligently seeking it and why the leaders in the industry resorted to such frantic efforts for the solution of this long standing problem. *Rohm and Haas Co.* v. *Roberts Chemicals*, (4cca) F. 2d 693, 697; *Otto* v. *Koppers Co.*, (4cca) 246 F. 2d .....

The Trust was dissolved 9th of Dec. 1950, due to some of the manufacturers leasing the accused device from the defendant. The Underwear Institute and the Trustees recognized that the accused device competed with the Redman patents and pending application, and that infringement would be involved; that the institute and the Trustees could not protect the Redman rights with the possibility of having to sue its members. It sought and obtained Redman's consent to dissolve the Trust and all patent and all trade mark rights were transferred to Redman. It is clear that the manufacturers were eager to get into operation at

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arliest moment a machine and method could be ob- d which would produce knitted fabrics that would not k out of fit.

spite of the contention of the defendant to the con- the accused device constitutes infringement of the alizer of '528 patent and the process infringes the s of '530 patent in suit.

e accused device used by Stedman produced the sam- ken by Pressnell [sic], Worthington and Lawson and eration constituted a normalizer as described and d in the '528 patent in suit and the method employed cessing these samples constituted a normalizing op- n under the Claims of the '530 patent.

im 1 of the '528 which is copied as foot note[1] is typical others. The accused device has means (belts) for the tubular knitted fabric lengthwise through a t zone while affording lengthwise freedom of the Its frame and pulleys of the propeller are within tment zone and operate to internally expand the fabric widthwise to effect lengthwise shortening tension on it lengthwise and means are employed it the fabric to relax and to reposition the stitches neir distorted shape while processed back to their

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[1] paratus for reducing shrinkage in tubular knitted fabric as been elongated lengthwise and narrowed widthwise by ng subsequent to knitting of the fabric; comprising means ing the tubular knitted fabric lengthwise through a treat- e while affording lengthwise freedom of the fabric, means d zone for internally expanding the tubular fabric width- ffect lengthwise shortening or condensing of the fabric, -handling means permitting the fabric to relax, whereby epositioning of the fabric stitches substantially to their nitted form and restoration of the fabric substantially to l condition.

substantial shape after being knitted and before the processing operation.

In like manner Claim 1 of patent '530 is typical. See foot note[2]. In the accused device the belts operate to move the tubular knitted fabric lengthwise through a treatment zone while providing lengthwise freedom of the fabric. As the fabric moves through this treatment zone, the fabric is expanded widthwise by the frame and pulleys of the propeller adjusted sufficiently wider than the width of the fabric as it entered the process to effect lengthwise shortening (condensing) of the fabric. Thereafter the finishing rolls and roll-up rolls operate to permit the fabric to relax both in width and in length. These steps of moving the fabric in the treatment zone with lengthwise freedom while being internally expanded widthwise to shorten and condense the fabric, then providing means for the fabric to relax freely, constitute, in their combination of methods, the restoration of the stitches both widthwise and lengthwise to their original knitted form and thereby restores the fabric substantially to its normal condition, thereby effectively overcoming the contortion of the stitches and of the fabric caused by processing after leaving the knitting head.

The defendant set up 31 U. S. and foreign patents and printed publications and several prior uses to show antici-

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[2] A method of reducing shrinkage in tubular knitted fabric which has been elongated lengthwise and narrowed widthwise by processing subsequent to knitting of the fabric, and the stitches of which are distorted lengthwise and widthwise, said method comprising moving the tubular knitted fabric lengthwise through a treatment zone while providing lengthwise freedom of the fabric, internally expanding the tubular fabric widthwise within said zone to effect lengthwise shortening or condensing of the fabric, and permitting the fabric to relax, whereby to effect repositioning of the stitches substantially to their original knitted form and restoration of the fabric substantially to its normal condition.

pation or lack of invention in the subject matter of the two Redman patents in suit. But they do not disclose or embody the Redman inventions. They relate to mill shrinkage and controls to avoid waste in producing garments but fall far short of eliminating or teaching how to eliminate shrinkage after wearing and laundering. It must be borne in mind that this is the invention of the patents in suit. It is definitely and conclusively established that the prior art utterly failed to accomplish this result. Defendant's expert was unable to name any one prior art which more nearly anticipated the patents in suit.

It is appropriate to quote what Judge Parker so well said in *Reynolds* v. *Whitin Machine Works*, 167 Fed. 2d 73 at page 83:

> "Defendant has cited 21 patents as basis for its contention that complainant's invention is lacking in novelty; and this in itself is evidence of the weakness of the contention. Such a citation of so many prior patents almost always means either that none of them are in point and that the patentee has brought together for the purpose of his inventions devices to be found in prior patents of different character, or that there have been prior attempts to solve the problem with which he was confronted which have not met with success. * * * Patents for useful inventions ought not be invalidated and held for naught because of such excursions into the boneyard of failures and abandoned experiments."

The Chief Engineer of Tubular Textile Machinery Corporation, Jules G. Walters, and Eugene Cohn and Samuel Cohn, Executive officers of the corporation, on December 10, 1949 filed application for patent covering their alleged inventions for method of and apparatus for treating tubular textile fabrics which culminated in patent 2,589,344. What

they said then covered the state of the prior art, excluding the patents in suit, as follows:

> "This invention relates to the treatment of tubular textile fabrics and *particularly to a novel method of preshrinking and setting such fabrics so that the garments made therefrom will not be subject to further substantial shrinkage as the result of laundering.*"

Then it describes the state of the Art and the standard processing procedure which utilized longitudinal tension, and said:

> "*Because of the longitudinal tension which is maintained throughout the steam treatment, no shrinkage is permitted, and consequently the finished fabric is subject to shrinkage when* laundered."

The next two paragraphs of that patent are very significant and are:

> "It is the object of the present invention *to provide a method of and apparatus for treating tubular textile fabric whereby the fabric is longitudinally compressed before, during or after steaming and is not therefore subject to substantial shrinkage as a result of laundering, an object which has long been considered desirable but heretofore has not been obtainable in the treatment of tubular textile fabrics.*"
>
> "*Another object of the invention is the provision* of *a method of and an apparatus for setting the stitches of a tubular textile material in their natural form and contour and free of internal stress, with a reduction in the inherent residual shrinkage so that garments made therefrom are not subject to* modification by substantial shrinkage." The court has supplied the underscoring. [Matter underscored by the Court here reproduced in italics.]

Although the foregoing patent issued March 18, 1952, it is not prior Art to the filing of plaintiff's application on Oct. 22, 1943 on which patent '528 and patent '530 issued although the issuing date was May 20, 1952. While application No. 159,296 was filed May 1, 1950, the subject matter of the co-pending application No. 55,963 was divided and was a continuation-in-part thereof.

The defendant contends that plaintiff learned about defendant's method and adjusted his claims to embody defendant's method. The plaintiff contends that the defendant obtained knowledge of plaintiff's invention and appropriated it and tried to beat him in filing an application. Tedious and careful consideration has been given to these contentions. Here again the evidence convinces the court that the defendant's contention is not sustained but that the evidence impels a finding in favor of the plaintiff's condition.

The Redman apparatus and method were demonstrated at an open house of the industry (knitting) in Spring City, on April 29, 1948. It is true that Eugene Cohn testified that no one connected with his company attended, yet he admits he was told about it by several of his customers. Ex. 73 which is an office memorandum dated June 28, 1948, Eugene Cohn to Mortimer Cohn, records the information Eugene obtained from Niel at Nazareth. This at least discloses the extreme spreading of the fabric after it has been bleached and extracted. It also discloses that the operation is without tension, allowing the cloth to lie in ripples (relaxed) while drying. Ex. 73C is a letter dated Dec. 23, 1948 from Flagg Knitting Co., to Tubular Textile Machinery Corp. and enclosed a clipping from Journal of Commerce from which a part is quoted:

> "Utica—Dec. 20. Six Underwear Mills have already signed lease agreements for the new Redman Shrink-

> ing Machine at a cost of $40,000.00 each. President Roy A. Cheney of the Underwear Institute told a meeting this weekend of local manufacturers."
>
> "The new pre-shrinking machine produce 800 pounds of fabric an hour, shrinking it and drying it. While the average shrinking of underwear in washing machines has been determined by the Bureau of Standards to be from 17 to 18 per cent, the new Redman machines have held shrinking to 3 to 4 per cent, Mr. Cheney said."

On January 3, 1949, a memorandum was sent from M. C. to E. C. and J. C. (Ex. 73B), subject Redman Process, in which he referred to the clipping and its contents and said:

> "I would like you to see this clipping and to then promptly discuss with me steps to be taken and to further investigate what is cooking in this situation."

The next memorandum is dated 6/8/50 from J. C. to E. C. telling of information from Mr. Lowery of E-Cut Knitting Mills, only part of which bears on this subject:

> "I asked him about the Redman Process and he told me that the machine in Spring City is working nicely and that E-Cut is getting some very nice results on their own cloth from the Redman Process. He also told me that the Redman machine up at Glendale, N. Y. which is Perry Knitting, is also running and he told me that the third machine for Pottsville Bleach and Dye is now at Pottsville on a siding ready to be installed."

On June 22, 1950, a memorandum is sent from J. G. W. (Walters chief Engineer of Tubular, etc.) to J. C. (Joseph Cohn) on subject of Redman Head. This memorandum,

Ex. 74, consists of four pages, single space typewritten details. The first paragraph starts with this sentence:

> "Attached hereto is drawing D3-95 in duplicate showing the system and apparatus that Redman uses for 'normalizing' his fabric."

Later he states:

> "From the moving pictures that we saw at the show these rolls # 1 are obviously driven."

Later he states:

> "Pop feels that we should go back to patent 2,228,001, issued January 7, 1941, Claim # 6 which he claims is an excellent Claim on what Redman is doing as shown in the movie."

After discussing the problems presented by the Redman Head, it said:

> "It is Pop's thought that possibly we could obtain some patent protection on a head similar to Redman's by adding belts such as shown in the sketch to his head or at least to exhaust the possibilties of propelling cloth by belts by these means."

The evidence shows that defendant was appropriating to its use the Redman inventions instead of Redman appropriating to himself the alleged inventions of Cohn and Walters. There is no question that Claims 1, 3 and 7 to 11 inclusive of '530 patent read on and find full response in the application # 55,963, filed Oct. 22, 1948 and the patent is entitled to that filing date. *Davis* v. *Baker-Cammack Hosiery Mills*, 86 F. Supp. 180, 186, affirmed 4 cca 181 F. 2d 550, 558.

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The first tensionless calender was a sample machine for demonstration purposes and retained by it. This machine was shown to Dunmore of Utica and King of Munsingwear during April, 1949. Defendant offered to build machines substantially like the sample and to lease them. The first order was received May 29, 1949. Thereafter the machine was built. Thus the first order and the first machine for the market occurred subsequent to May 1, 1949 or within one year of the last application filed May 1, 1950. Even that machine had to have the bouncer [sic] roll added in August. The sample as such was incomplete and did not constitute public use or offered for sale within the statute. *Sturdevant* v. *Massachusetts Hair and Felt Co.*, 124 F. 2d 95, 97, Cert. den. 315 U. S. 823; *Rohn and Haas Co.* v. *Roberts Chemicals*, 4 cca decided May 27, 1957, 345 Fed. 2d 693; *Long Manufacturing Co.* v. *Holliday*, 4 cca 245 Fed. 2d ———

Stedman Manufacturing Co. has infringed the patent claims in suit by using the accused device and Tubular Textile Machinery Corporation has also infringed the patent Claims in suit by making and leasing to Stedman for use in this district the accused device. The latter company has assumed, controlled and conducted the defense of Stedman in this case pursuant to its contract with Stedman and is therefore bound by the judgment herein. *Baker-Cammack* v. *Davis Co. Supra; Aghnides* v. *Kress and Co.*, 140 F. Supp. 582, 587; affirmed —— Fed. 2d ——. Judgment in acordance herewith will be entered.

This the 23rd day of September, 1957.

s/ JOHNSON J. HAYES,
United States District Judge.

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THIS CAUSE came on to be tried before the Court, sitting without a jury, and the Court having considered the evidence introduced by the parties, including stipulations, depositions, exhibits, and the entire record in the cause, as well as the briefs and arguments of counsel for the respective parties; and the Court having heretofore made and filed its Findings of Fact and Conclusions of Law, as the same appear of record, which are made a part hereof by reference thereto;

IT IS, THEREFORE, ORDERED, ADJUDGED AND DECREED as follows:

1. That this Court has jurisdiction of this cause and of the parties hereto. Tubular Textile Machinery Corporation, Woodside, Long Island, New York assumed the complete defense of this cause, both monetarily and by the selection of defendant's attorneys.

2. That United States Letters Patent No. 2,597,528 were duly and lawfully issued to the plaintiff Frank R. Redman on May 20, 1952, and that plaintiff Frank R. Redman is the sole and exclusive owner of the entire right, title and interest in and to said Letters Patent, together with all rights of action for past infringement thereof.

3. That United States Letters Patent No. 2,597,530 were duly and lawfully issued to the plaintiff Frank R. Redman on May 20, 1952, and that plaintiff Frank R. Redman is the sole and exclusive owner of the entire right, title and interest in and to said letters patent, together with all rights of action for past infringement thereof.

4. That the plaintiff Redman Process American Corporation is exclusive licensee under said Letters Patent No. 2,597,528 and No. 2,597,530, with the exclusive right to grant sublicenses thereunder.

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5. That said Letters Patent No. 2,597,528 are good and valid in law as to claims 1, 2, 3, 4, 5, 6 and 7 thereof, being all of the claims in issue herein.

6. That the defendant Stedman Manufacturing Company has infringed each of claims 1, 2, 3, 4, 5, 6 and 7 of said Letters Patent No. 2,597,528 by its use of the Tube-Tex Tensionless Calender manufactured by and leased to the defendant by Tubular Textile Machinery Corporation, Woodside, Long Island, New York.

7. That said Letters Patent No. 2,597,530 are good and valid in law as to claims 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12 and 13 thereof, being all of the claims in issue herein.

8. That the defendant Stedman Manufacturing Company has infringed each of claims 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12 and 13 of said Letters Patent No. 2,597,530 by its use of the Tube-Tex Tensionless Calender manufactured by and leased to the defendant by Tubular Textile Machinery Corporation, Woodside, Long Island, New York.

9. That the defendant Stedman Manufacturing Company, its directors, officers, associates, agents, attorneys, confederates, and employees, and those in active concert or participation with them, who receive actual notice of the Judgment and Injunction by personal service or otherwise, be and they are hereby perpetually restrained and enjoined from using, or causing to be used, the Tube-Tex Tensionless Calender as heretofore used by defendant in the reduction of shrinkage in tubular knit fabrics, and from in any other manner infringing upon claims 1, 2, 3, 4, 5, 6, and 7 of said Letters Patent No. 2,597,528 and claims 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12 and 13 of said Letters Patent No. 2,597,530, or any of them.

10. That Tubular Textile Machinery Corporation, its directors, officers, associates, agents, attorneys, confeder-

ates, and employees, and those in active concert or participation with them, who receive actual notice of this Judgment and Injunction, by personal service or otherwise, be and they are hereby perpetually restrained and enjoined from using, or causing to be used, or actively inducing, or aiding and abetting others to use, a Tube-Tex Tensionless Calender in the manner heretofore used by defendant in the reduction of shrinkage in tubular knit fabrics, and from in any other manner infringing upon claims 1, 2, 3, 4, 5, 6 and 7 of said Letters Patent No. 2,597,528 and claims 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12 and 13 of said Letters Patent No. 2,597,530, or any of them.

11. That the plaintiffs Frank R. Redman and Redman Process American Corporation shall have and recover from the defendant Stedman Manufacturing Company the damages which the plaintiffs have sustained by reason of the aforesaid infringement by defendant.

12. That this cause shall be referred to [Hon. Rufus Reynolds] as Special Master to ascertain the damages adequate to compensate the plaintiffs for the infringement by defendant Stedman Manufacturing Company.

13. That the plaintiffs recover of the said defendant the taxable costs of the plaintiffs in this suit incurred against them and such costs and expenses as may be incurred by the Special Master in connection with his services herein, and that the plaintiffs shall have judgment and execution against the defendant for said costs.

Entered this 23rd day of September, 1957.

s/ JOHNSON J. HAYES,
U. S. D. J.

Opinion, U. S. Court of Appeals for the Fourth Circuit

No. 7563

(Reargued April 23, 1958. Decided July 17, 1958.)

Before SOBELOFF, Chief Judge, and SOPER and HAYNSWORTH, Circuit Judges.

SOPER, Circuit Judge:

This suit for patent infringement is based on two United States Patents issued to Frank R. Redman on May 20, 1952, which relate to an apparatus and a method for treatment of tubular knitted fabrics, that is, patent No. 2,597,528 which was applied for October 22, 1948, and patent No. 2,597,530 which was applied for May 1, 1950. Patent '528 covers the apparatus and patent '530 the method of operating the apparatus. The suit was brought by Frank R. Redman and Redman Process American Corporation, the exclusive licensee of the patents, against Stedman Manufacturing Company of North Carolina, which is accused of infringing the patents by the use of a machine, called a "Tube-Tex Tensionless Calender." This machine was leased by it from the Tubular Textile Machinery Corporation of New York (hereinafter called "Tubular Corporation") which is defending the suit. This appeal is taken from a judgment of the District Court wherein both patents were held valid and infringed by the defendant.

Tubular knitted fabrics are used in the manufacture of such garments as T-shirts, children's sleepers, athletic undershirts and polo shirts. In general terms, the purpose of the patents is to eliminate as far as practicable the shrinkage of the garments when they are laundered. For many years the knitting industry had recognized that excessive

shrinkage occurred when garments of this sort are laundered and many efforts have been made to solve the problem. Redman claims that his patents provide a means and method for obtaining a fabric which is pre-shrunk to such an extent that the residual shrinkage of the manufactured garment when it is laundered has been reduced to a minimum. The defendant on the other hand contends that every element of the Redman apparatus had been previously employed in the art, and that the claims of the patent are so broad that they cover all pre-existing apparatus of the prior art and are not confined to the structure disclosed by the patents. It is further said that the Redman patents are distinguished from the prior art only in extreme width-wide stretching of the knitted material when it is treated, and that this element is not included in the claims and is not used by the defendant.

The problem which the patentee sought to solve was caused by the inherent characteristics of the tubular knitted fabric. Under the standard practice it is knitted under tension in lengths of 100 or more yards in such fashion that the stitches are loop shaped. When the fabric is stretched in length it becomes narrower in width and when it is expanded in width it becomes shorter in length. After the knitting operation is completed the fabric is subject to several wet-processing steps, under which its shape is distorted. It is pulled longitudinally under severe tension through a wet-scouring solution, then through a bleaching or dyeing solution between rollers, and then through a wash and an extractor. During this treatment the fabric is in a soft, wet and elastic state and the stitches are elongated and narrowed from the shape they had after knitting and the fabric as a whole is distorted. Later, when it is dyed and pressed between rollers in a calendering operation at the desired width, it becomes set in this distorted condition and, when it is used in the manufacture of garments and they are subsequently laundered, the distorted stitches of

the fabric return to their original relaxed condition and excessive shrinkage occurs. The purpose of the operation described in the patents is to "normalize" or restore the fabric and its component stitches or loops after the processing operations to the original undistorted condition so that the residual shrinking upon laundering is reduced to a minimum or to a small unobjectionable percentage. In this way a preshrunk knitted garment is obtained.

The apparatus depicted by the Redman patents shows the course which the material follows after it has been elongated and narrowed in the wet-processing steps. The fabric is drawn over rollers, whereby it assumes a generally flattened form, and thence it is carried by power-driven feed rolls to a spreader, consisting of a series of expanding wheels, to a take-off roller of relatively large diameter, and thence it goes to a conveyor, which transports it through a drier. As the fabric moves from the feed rolls over the spreader it is relaxed and is free lengthwise so that the stitches flow freely during the expansion. The large take-off roller moves at a slower speed than the drive rolls so that the fabric is carried away without appreciable tension and is deposited on a conveyor in a relaxed condition. The conveyor which draws the material through the drier moves at a slower speed than the take-off roll so as to permit relaxation of the fabric. The result is that the fabric is not pressed and set but has freedom both lengthwise and widthwise and the stitches are free to flow and return to their original knitted form.

Throughout the specification the emphasis is placed upon the "normalization" of the fabric by returning it substantially to the unstretched condition which prevailed after it was knitted and before it was processed. This is accomplished by feeding the fabric lengthwise with sufficient freedom to permit widthwise expansion without subjecting it to appreciable lengthwise tension. The figures of the

tents indicate the relaxation of the fabric by showing at it is disposed in loose folds lengthwise as it passes om the driving rolls to the take-off rolls and also in pass- g from the take-off roll to the conveyor upon which it is posited in a relaxed condition. The "normalizing" proc- s takes place as the fabric is advanced through the ap- ratus in this manner.

Claim 1, which is a typical claim in the patent, is as ollows:

> "1. Apparatus for reducing shrinkage in tubular knitted fabric which has been elongated lengthwise and narrowed widthwise by processing subsequent to knitting of the fabric, comprising means for moving the tubular knitted fabric lengthwise through a treatment zone while affording lengthwise freedom of the fabric, means within said zone for internally expanding the tubular fabric widthwise to effect lengthwise shortening or condensing of the fabric, and fabric handling means permitting the fabric to relax, whereby to effect repositioning of the fabric stitches substantially to their original knitted form and restoration of the fabric substantially to its normal condition."

The critical element in this claim is expressed in the hrase "fabric-handling means permitting the fabric to elax."

A great many prior patents were cited against the Red- patents in the District Court but on this appeal the ndant has simplified the issue of validity by confining self to a single machine which was developed by the Tubular Corporation and has been used extensively by its ustomers for more than twenty years. It is shown in detail n two United States patents owned by Tubular, which were issued to S. Cohn *et al.*, namely, patent No. 2,187,644

issued January 16, 1940, and patent No. 2,228,001 issued January 7, 1941. The contention is that the disclosures of these patents invalidate the patents in suit.

Patent '644 discloses an apparatus which provides means for steaming the tubular fabric and then finishing it over a spreader whereby the fabric is distended to the desired width, and then it goes through a second steaming and is carried to the finishing rolls where it is pressed flat and set at the width to which it has been spread. After this has been done the fabric is wound on a roll.

The stated purpose of the patent is to provide uniformity of the knitted material by producing a flattened fabric tube of the desired width free from excessive or irregular longitudinal or transverse shrinking so that the longitudinal extension with relation to the transverse distention as well as the shrinking attendant upon the finishing operations may be controlled. The fabric attains and retains the final permanent width and length when it passes the finishing rolls and is wound up.

The spreader is adjusted so as to attain a predetermined width. It consists of a frame equipped with rollers which are driven so as to propel the fabric toward the finishing rolls. Since the material tends to shorten in length as it is spread, the speed of the propellers is adjusted in relation to the speed of the finishing rolls so as to avoid excessive tension of the material between the propelling and the finishing rolls. Thereby the proper relation between width and length is maintained and a uniform number of yards per pound is produced.

Patent '001 discloses the same relation of parts for the same purposes as is disclosed in patent '644. It was designed as an improvement over the machine of patent '644 and is known as the Tubular Straight Line Calender. The spreader of the '001 patent advances the fabric not merely by the co-action of the propeller rolls and the finishing

rolls, as in patent '644, but also by co-action between the propeller rolls and moving belts which extend over the outside face of the spreader so as to eliminate distortions between the marginal edge and the center portions of the fabric.

The speed between the spreader drive rolls and the pressure rolls is regulated to control the longitudinal tension of the fabric so as to give the fabric a predetermined width. The transverse tension, however, is largely determined by the width of the spreader and a variation in the ratio between longitudinal and transverse tension and involves merely a variation in the longitudinal tension. The purpose is to secure a specified width and length for a given weight of the material so as to attain a desired yield of the fabric for the manufacture of garments.

It is contended that these prior patents disclose the essentials of the patents in suit and especial emphasis is placed upon the references to variations in speed which is maintained between the sets of rollers so as to regulate the longitudinal tension upon the fabric as it is drawn through the machine. One important purpose was to eliminate as far as possible the shrinkage of the fabric during the finishing operations which had greatly troubled the industry. Thus, in patent '644 it is said that the finishing rollers are preferably operated somewhat more slowly than the propellers so that the shrinkage which takes place in the fabric during the steaming operation may be compensated by an excess delivery of fabric at the place of initial propulsion; and in patent '001 it is said that the method includes the regulation of longitudinal tension relative to transverse tension and in particular the substantial or complete elimination of longitudinal tension especially in operations involving fabric shrinkage.

These passages from the patents obviously relate to what is called mill shrinkage which occurs during the fin-

ishing operations and not to shrinkage of articles manufactured from the fabric. However, the patents also make some reference to shrinkage of the latter sort. Thus, in patent '644 it is said that during the processing operations the fabric is enabled to shrink and to establish what may be called its natural proportions in width and length and thus treated will hold its dimension and can be cut into garments which will hold their shape after laundering.

Again in patent '001 it is said that one of the advantages of the patented process is that the fabric will not change its proportions after washing in the manner or to the extent theretofore considered inevitable.

The evidence in the case, however, demonstrates quite clearly that the harmful shrinkage of garments made from the fabric *after it was processed* in these machines was in fact not eliminated. It was known that as the fabric came from the knitting machines the stitch was round but that it changed to an elongated or elliptical form after processing and then after laundering the stitch tended to return to a round shape. All are agreed that the problem had existed for many years and it was conclusively shown in the trial below that it still existed as late as 1949. In other words, the problem still persisted in spite of the structures described in the Cohn patents. This was shown not only by the testimony of witnesses experienced in the trade but by statements emanating from the Tubular Corporation itself, which is defending this suit.

Much evidence on this point was taken in the three weeks trial in the District Court. Sufficient confirmation of the persistence of the difficulty is found in the interest taken in the subject by the Underwear Institute, a trade organization in which a majority of the manufacturers of knitted underwear in the United States are members. The opinion of the District Judge shows that in 1944 the Institute became interested in the Redman inventions and

appointed a committee of mechanical experts from the larger knitting companies to investigate and make recommendations. The result was that the Institute entered into a trust agreement with Redman whereby he transferred his patents and applications for patents to trustees and was employed at a salary of $12,000 annually to continue his efforts to develop an apparatus which would avoid shrinkage of the garments made from tubular fabric. The trustees were empowered to grant licenses under the patents and collect fees. Contributions amounting to $121,500 were solicited and received from fifty-nine knitting companies to promote the work. It culminated in the filing on October 22, 1948, of the application on which the patents in suit were issued.

The first public demonstration of the Redman apparatus took place at an open house of the knitting industry on April 29, 1948, which was attended by between two and three hundred men. Between May 1948 and July 1949 fabrics were processed on the experimental machine in forty-five different mills. In the year beginning December 1949, the trustees issued a total of fifteen licenses to various knitting mills.

Meanwhile, in July 1949, the Tubular Corporation delivered the first of its accused machines, and by the end of that year leased twelve of them to various leaders in the knitting industry. This situation led to a dissolution of the Redman Trust. Since the licensees of the Tubular Corporation were members of the Underwear Institute it was confronted with the possibility of litigation involving charges of infringement of the Redman patents by certain of its own members. Accordingly, the Trust was dissolved in May, 1951 and the patents were turned back to Redman. The Institute notified its members of the dissolution of the Trust and announced that it took pride in the fact that the contributors to the Trust were the first in the field to

sponsor and develop methods of pre-shrinking for knit fabrics. At the time of the trial in the District Court twenty-five licenses had been granted under the Redman patent to well known knitting mills in various parts of the country. The total payments by the licensees and the total poundage of fabrics manufactured under the patents amounted to substantial sums.

Under these circumstances a controversy has arisen as to whether Redman or the Tubular Corporation was the first to devise the apparatus to solve the problem. The defendant contends that the plaintiff first learned of its method and adjusted his claims accordingly, while the plaintiff claims that the defendant developed its machine through knowledge of the plaintiff's invention. This controversy was given careful consideration by the District Judge, who reached the conclusion that the evidence compelled a finding in favor of the plaintiff. The judge found that the Redman demonstration was made publicly in the presence of large numbers of the leaders of the industry and that information as to what occurred at the meeting was communicated to the Cohns. We are satisfied, from an examination of the record, that this conclusion is supported by substantial evidence. It is noteworthy that the application on which the patents in suit was based was filed October 22, 1948, prior to the two applications covering the new method which were filed by Cohn after the public demonstration of the Redman apparatus. These applications were filed on December 10, 1949 and January 4, 1950, respectively, and led to patents No. 2,589,344 and No. 2,589,345 which, as we shall see, cover the accused machine. The Judge correctly found that the disclosures of these later Cohn patents are not prior art references against the patents in suit.

There is additional striking evidence proceeding from the Tubular Corporation itself which shows that the machines of the earlier Cohn patents did not obviate the

shrinkage of the laundered garments. In the specification for the later Cohn patent '344, the patentee described the prevailing method of processing the fabric by steaming and calendering operations and pointed out the unsatisfactory results in the following words: "Because of the longitudinal tension which is maintained throughout the steam treatment, no shrinkage is permitted, and consequently the fabric is subject to shrinkage when laundered."

A similar comment on the excessive shrinkage which was attendant upon the earlier operations is described in the following passage in the specification of the Cohn patent '345:

> "It is the object of the present invention to provide a simplified method of and apparatus for finishing tubular textile fabric whereby the fabric is spread, propelled, steamed and wound upon a roll and whereby the fabric is longitudinally compressed during the finishing operation and is not therefore subject to further substantial shrinkage. This object has been needed in the industry but never heretofore obtainable."

Again, in the proceedings in the Patent Office upon the application for Cohn patent '345, the patentee, in endeavoring to show that his invention was not anticipated in his prior patent '644, made the following statement:

> "• • • It is true that in the patent (No. 2,187,644) the fabric is advanced at differential speeds so that there is some relaxation of the longitudinal tension on the fabric. However, this is merely for the purpose of compensating for shrinkage during the steaming operation, • • •
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> • • •
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> "The fact is that the apparatus described in patent No. 2,187,644 was intended merely to relax the

longitudinal tension sufficiently to permit shrinkage when the steam was applied, but there was no intention in this structure, nor is any disclosed, of advancing the fabric in a manner so that riffles would be formed and all longitudinal tension eliminated. Furthermore, the patent, to accomplish its purpose, depends upon the use of the finishing rollers or calender rolls, which subject the fabric to rolling pressure equivalent to ironing. In other words, the patent does precisely what the inventors in the present application wish to avoid. * * *

"From a practical standpoint, the invention as described in the present application * * * is revolutionary in respect to procedures heretofore used in the art. * * *"

These statements, which were made on behalf of the Tubular Corporation in reference to Cohn patents '344 and '345, have an important bearing on the issues in this case. They demonstrate not only that the problem was not solved by the earlier Cohn patents '644 and '001 but they support the ultimate conclusion that the Redman patents are valid, because they represent the attempt of an experienced manufacturer to appropriate the long sought solution which Redman had disclosed. They serve also to show that the accused machine, the Tube-Tex Tensionless Calender, manufactured by the Tubular Corporation, infringes the Redman patents, for it is conceded that this machine is described in the Cohn patent '345. The statements in the specification of that patent are significant. It refers to the prior practice whereby shrinkage occurred in garments which had been made from fabric stretched and pressed in the processing operation, and announced the discovery that this shrinkage could be substantially eliminated if the fabric is relaxed and longitudinally "riffled" during the steaming process. The figures of the patent show that the cloth is

fed to the apparatus under a slack condition by control of speeds and is advanced by a spreading and propelling device which is so constructed that the fabric is spread to the desired width and propelled in such a manner that the rearward portion is delivered at a speed in excess of that of the forward portion, whereby "riffles" are formed in the surface of the forward portion and it is freed from longitudinal tension. Immediately after the steaming process the fabric is delivered to a winding mandrel so operated that it takes up the fabric without exerting any tension. The crucial step in the operation, whereby the shrinkage of manufactured garments is minimized, is the formation of "wrinkles, creases, folds or rumples" which extend transversely across the fabric as it proceeds through the apparatus. This step, as we have seen, is the heart of the prior Redman patent.

This compression or relaxation of the fabric longitudinally while the fabric is spread laterally to the desired width in the finishing operations does not entirely eliminate the shrinkage of the laundered garments, but it reduces the shrinkage so markedly that it is accepted by the trade as a practical improvement of great value. It may seem to involve so small an advance over the control of longitudinal tension previously employed as to have been obvious to the industry, but actually it was only after a long period of experimentation that it was hit upon and then widely approved. Therein lies its patentability. A similar seemingly small step in the papermaking industry was recognized as invention in *Eibel Co.* v. *Paper Co.*, 261 U. S. 45. The improvement of the process consisted merely in the elevation of the end of a moving screen so as to enable the stream of papermaking liquid stock upon the screen to keep pace with the screen itself and to run smoothly without rippling; but it increased the productivity of the machine to such an extent that it was generally adopted by the industry as the remedy of an old defect for which a cure had long been

sought. Accordingly, it was held to involve invention and to be entitled to a patent. The Court said (page 63):

> "In administering the patent law the court first looks into the art to find what the real merit of the alleged discovery or invention is and whether it has advanced the art substantially. If it has done so, then the court is liberal in its construction of the patent to secure to the inventor the reward he deserves. If what he has done works only a slight step forward and that which he says is a discovery is on the border line between mere mechanical change and the real invention, then his patent, if sustained, will be given a narrow scope and infringement will be found only in approximate copies of the new device. It is this differing attitude of the courts toward genuine discoveries and slight improvements that reconciles the sometimes apparently conflicting instances of construing specifications and the finding of equivalents in alleged infringements. In the case before us, for the reasons we have already reviewed, we think that Eibel made a very useful discovery which has substantially advanced the art. His was not a pioneer patent, creating a new art; but a patent which is only an improvement on an old machine may be very meritorious and entitled to liberal treatment."

We find no substance in the additional contention of the defendant that Redman's only contribution to the art was an extreme stretching widthwise of the fabric while it was being processed. This argument rests on the declaration in the specification of Redman patent '528 that normalization "can be accomplished by expanding the tubular fabric widthwise to a circumferential dimension substantially equal to the circumferential dimension at which the fabric was knitted"; and it is emphasized that Cohn testified

that the accused machine was not adapted to the extreme overspreading of cloth.

The specification of patent '528, however, immediately after the quoted passage, goes on to say "and simultaneously feeding the tubular fabric lengthwise with sufficient lengthwise freedom to permit such widthwise expansion of the fabric without subjecting it to any appreciable lengthwise tension." The novelty lies mainly in the step, described in the last quoted words, which Cohn, following Redman, found to be essential. The evidence shows that Cohn himself employed substantial widthwise stretching and the advertisements of the Tubular Corporation, in extolling the merits of its machine, shows that overspreading is used by most mills to control the lengthwise shrinkage. The point is of little moment in any event, for infringement would not be avoided merely by showing that the widthwise stretching of the material by the accused machine is not so great as that indicated by the Redman patent.

Affirmed.

Judgment, U. S. Court of Appeals for the Fourth Circuit

UNITED STATES COURT OF APPEALS

FOR THE FOURTH CIRCUIT

No. 7563.

APPEAL FROM the United States District Court for the Middle District of North Carolina.

THIS CAUSE came on again to be heard on the record from the United States District Court for the Middle District of North Carolina, and was reargued by counsel.

ON CONSIDERATION WHEREOF, It is now here ordered, adjudged and decreed by this Court that the judgment of the said District Court appealed from, in this cause, be, and the same is hereby, affirmed with costs.

SIMON E. SOBELOFF
Chief Judge, Fourth Circuit.

MORRIS A. SOPER
United States Circuit Judge.

CLEMENT F. HAYNSWORTH, JR.
United States Circuit Judge.

FILED
JUL 17 1958
R. M. F. WILLIAMS, JR.
Clerk

Order Denying Petition for Rehearing

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE MIDDLE DISTRICT OF NORTH CAROLINA, AT GREENSBORO.

The petition for rehearing filed by the appellant herein having been read and considered, is ordered this 17th day of September 1958 that the same be and is hereby denied.

SIMON E. SOBELOFF
Chief Judge, Fourth Circuit.

MORRIS A. SOPER
United States Circuit Judge

CLEMENT F. HAYNSWORTH, JR.
United States Circuit Judge

FILED
SEP 18 1958
R. M. F. WILLIAMS, JR.
Clerk